

ONE NEW GENUS AND EIGHT NEW SPECIES OF DIP-
TEROUS INSECTS IN THE UNITED STATES NATIONAL
MUSEUM COLLECTION.

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In this paper there are presented descriptions of four species of Simuliidæ from Peru which were sent in for identification by Mr. C. H. T. Townsend, chief of the entomological station, Lima, Peru. The species of this genus are at present the subject of study by the writer of this paper in connection with the pellagra investigation. Owing to the theory which has been put forward that they are the possible transmitters of this disease, and as these four species are undescribed it is considered advisable to give descriptions now rather than await the publication of the paper dealing with the North American species which is in course of preparation. The Pipunculidæ are parasitic on leaf hoppers (Hemiptera-Homoptera) and are of considerable economic importance.

SIMULIUM BICOLORATUM, new species.

Plate 46, figs. 6, 7.

Female.—Frons black, shining, with slight whitish dusting, raised in center, slightly tuberculate at lower angles, sides very slightly divergent toward vertex, width at upper angle of eyes about one-fourth the breadth of head; face (see fig. 6) distinctly white dusted, especially on upper portion, the dusting below the bifid raised portions yellowish, very few hairs on either face or frons, antennæ broken, but the two basal joints still left are black; palpi black, postocular cilia pale, with an admixture of much longer black hairs. Prescutum bright yellow, scutum concolorous, opaque, with opaque deep black marking as in figure 7, pilosity sparse and hairlike, yellow, some upright black hairs on posterior margin, middle part of extreme lateral margin deep black, pleuræ brownish, yellowish posteriorly, on center with silky white pollinosity, pleural hair tuft brown; scutellum clear yellow, with numerous upright black hairs which are most con-

spicuous on anterior lateral angles; postnotum deep black with a silvery sheen. Abdominal basal scale yellow, fringe long, yellow, first segment yellow, darkened at apex, next three opaque, velvety black, apical four segments shining brown-black, sides of fifth yellow, apical four segments with scattered pale, and numerous longer, black hairs. Legs black, fore coxæ, bases of all femora, and all tibiæ except apices yellow; all pale portions of legs with silvery, very short pilosity, the black parts with black pilosity, the usual scattered, long, black, upright hairs on all legs, basal joint of hind tarsus with prolonged apical flaplike process posteriorly, second joint of same tarsus with scalelike basal process and dorsal constriction; claws with minute tooth in addition to the basal tubercle. Wings clear, with a slight indication of grayish color at apex, costal vein black-brown at base, becoming black shortly beyond base, subcostal vein yellowish, apical portions of first vein and radial vein black, costal vein with short spinelike bristles and soft hairs, first and radial veins joining the costa very close together and forming a conspicuous black thickening of the costa at about midway from end of subcosta to end of costa which tapers off to end of costa, venation normal. Halteres yellow with base of stalk darkened.

Length.— $2\frac{1}{2}$ mm.

Type.—Cat. No. 15304, U.S.N.M.

One female, Rio Charape, Peru, September 13, 1911 (C. H. T. Townsend).

This species is readily distinguishable from any other in the genus by the remarkable coloration of the thorax and abdomen. I know of no closely allied species already described.

SIMULIUM BIPUNCTATUM, new species.

Plate 46, fig. 8.

Female.—Frons black-brown with distinct, metallic, whitish dusting, sides divergent, about three-fifths as wide at above antennæ as at upper angle of eyes, surface hairs upright, black, widely placed and evenly distributed, face almost as wide as frons at upper angle of eyes, concolorous with frons, white dusted, distinctly longer than broad, the surface hairs black, shorter and more numerous than those on frons, antennæ brown, yellowish or three first joints, palpi brown. Mesonotum opaque, ochreous yellow, scutum with indications of a divided central darker stripe and a broader, shorter stripe on each side; in certain lights there is visible on the anterior part of the division between the middle and lateral stripes, where they stop short of anterior margin, a metallic white (or pearly) elongate spot; prescutum and scutum with distinct, black, close-lying hairs which are most distinct and longest on anterior and posterior margins, pilosity regular and rather hair-like, golden yellow; pleuræ yellow,

brown on lower half of middle portion, membranous portions with longitudinal fold-like striations, in front of wing base a black streak and immediately beneath wing base a round black spot on nearly the level of the pleural tuft which is pale in color, scutellum opaque yellow, posterior margin with long, upright, black hairs, disk with yellow pilosity; postnotum yellow, with black, lateral, longitudinal streak at base. Abdomen opaque yellow, brownish at apex, surface hairs black, longest on apical segments, basal scale yellow, fringe yellow. Legs yellow, tarsi and apices of tibiæ of forelegs, mid tarsi except base of first joint, and apices of tibiæ, most of basal and all but base of second joint of tarsi of hind legs black or brown-black; all legs with many scattered, short, and several long, upright, black hairs, as well as close-lying pale pilosity; apex of basal joint of hind tarsi produced at apex on posterior surface, second hind tarsal joint with basal scale and dorsal excision; basal joint with rather distinct row of about 20 bristles on anterior surface, claws with small sub-basal tooth. (See fig. 8.) Wings clear, thick veins yellow, radial vein unforked, joining the costa very close to first vein; a thick tuft of black hairs at base of first vein. Halteres yellow.

Length.—1-1½ mm.

Type and paratypes.—Cat. No. 15305, U.S.N.M.

Nine females, Rio Charape, Peru, September 13, 1911 (C. H. T. Townsend).

Resembles *notatum* Adams, but separable by the color of thorax, and pilosity, and also the shape of claws.

SIMULIUM TOWNSENDI, new species.

Plate 46, fig. 9.

Female.—Frons black, thickly white dusted except on upper half of center, raised somewhat, centrally, on upper half and on lower lateral angles, the sides very slightly divergent posteriorly, surface hairs black, confined to outer third on each side, face thickly white dusted, as broad as frons at upper angle of eyes, distinctly but not greatly longer than broad, surface hairs black; antennæ brown, basal two joints and base of third joint yellow, pilosity whitish; palpi black, the hairs concolorous; postocular cilia mostly black. Scutum opaque black with indications of a grayish bifid central stripe and a broader one on each side, on the narrow curved stripe between those there is a whitish pollinosity, which is very distinct and forms a large pear-shaped spot on near to anterior lateral angle of scutum where the stripe broadens; scutum and prescutum with black upright hairs, which are short on the disk, and yellow scale-like pilosity which is rather sparse and irregularly arranged though not forming groups; sides of scutum gray dusted, prescutum yellow or brownish-yellow; pleuræ brown, darker anteriorly, bare except for pleural tuft, which

is brown in color; scutellum largely yellow, upright hairs brown, pilosity yellow; postnotum with silvery white pollinosity. Abdomen black or black-brown, basal four segments opaque, apical four glossy; numerous brown hairs on apical segments, which are longer on apex and laterally; segment underneath basal scale silvery; basal scale brown, fringe pale brownish yellow. Legs yellow, apices of tibiae and whole of tarsi of forelegs, coxæ, trochanters slightly, femora indistinctly on center, apical half of tibiae, apices of basal and all remaining joints except base of second of tarsi of mid and hind legs black; all legs with yellow, long, close-lying pilosity and scattered, upright, black hairs, the first and third fore, second and third mid and hind tarsal joints with two long apical paired hairs each; apex of basal joint of hind tarsi extended on posterior surface, second joint on same tarsi with basal scale and constriction; claws with small subbasal tooth. (See fig. 9). Wings grayish, thick vein brown, cross vein at three-fifths from base of subcosta, venation normal. Halteres yellow.

Length.—4 mm.

Type and paratypes.—Cat. No. 15306, U.S.N.M.

Ten specimens, Rio Charape, Peru, September 13, 1911, collected by C. H. T. Townsend, after whom the species is named.

This species bears a very close resemblance to *virgatum* Coquillett, from which it may be distinguished by the different colored legs, which are very consistently colored throughout the whole series, and also by the almost entirely black postocular cilia and the pale scutellum.

SIMULIUM NITIDUM, new species.

Female.—Frons glossy black, almost undusted, sides nearly parallel, surface hairs black, sparse, confined to near lateral margins; face black with thick opalescent dusting, distinctly broader than frons and almost twice as long as broad, surface hairs sparse, black; antennæ brown, basal two joints and base of third joint yellow, pilosity white; palpi black-brown; hairs concolorous; postocular cilia black. Mesonotum glossy black, viewed from directly above with a divided pearlaceous central stripe and two broader lateral stripes, neither of which reaches beyond posterior third; the middle stripe extends to anterior margin, but the side stripes are much shorter; when viewed from behind the intervening spaces on scutum are pearlaceous, the anterior extremities of curved stripe being noticeably so, and the stripes already mentioned are glossy black; pilosity yellow, almost hair-like, with a few short black hairs on anterior margins, and several in prescutellar depression, prescutum slightly yellowish; pleuræ black, with distinct white pollinosity; scutellum black, pilosity yellow, upright hairs black. Abdomen opaque, velvety black on basal four segments, glossy black on apical

four, basal scale opaque black, segment underneath it with pearlaceous pollinosity, basal fringe brownish yellow; apical four segments with scattered black hairs. Legs black, fore coxæ, femora, and tibiæ brownish, knees and bases of first three tarsal joints of mid and hind legs yellow, the first tarsal joints broadly so; first joint of hind tarsi produced at apex posteriorly, second with basal scale and dorsal constriction; claws as in *townsendi*, all legs with thickly placed scale-like pilosity and scattered, longer, upright, black hairs, both of which are specially noticeable on the dorsal surfaces of tibiæ. Wings clear, thick veins brown, venation normal; a tuft of brown hairs on base of first vein. Halteres clear yellow, stalk dark at base.

Length.—Nearly 2 mm.

Type and paratype.—Cat. No. 15307, U.S.N.M.

Two females, Huancabamba, Peru, September 6, 1911 (C. H. T. Townsend).

Allied to *miniusculum* Lutz, but he makes no mention of the glossy apical abdominal segments, though they probably are of that color in his species, and he gives the abdominal hairs as pale. The size of the species he describes is also less, 1-1½ mm. and the locality Brazil.

LIMOSINA PICTURATUS, new species.

Plate 46, fig. 1.

Male.—Frons brownish yellow, blackened from anterior orbital bristles, narrowly, on ocellar triangle, and on vertex, opaque except on those parts, on center and on the bases of the central rows of bristles; lower orbital bristle at middle, very near to second pair, second about five times as far from upper pair as from lower, ocellar bristles widely divergent, only two pairs of weak centrals; behind ocellar region on each side and at base of each of the vertical row of bristles there is a white pollinose spot. Face produced between antennæ, distinctly shining on upper and lower margins, subopaque and paler yellow on center, concave in profile; cheeks yellow, subopaque, at center about one-third as high as eye at center, anterior vibrissa strong, incurved; posterior to it and almost below center of eye a strong upcurved bristle, and on the oral margin numerous hair-like bristles. Antennæ brownish, third joint rounded, second joint with several bristles, third with short pale pilosity; arista distinctly pubescent, about one-third longer than the breadth of frons. Mesonotum black, a series of four white pollinose spots in center, the first on the anterior margin and the last just in front of the scutellum, an irregular stripe of same color from the inner angle of humerus, which stops short of the anterior dorso-central bristle, at the base of which as well as of the posterior pair there is a pollinose spot; other spots are on the humeri, immediately behind humeri, posterior to the last but nearer to center of disk, and one above wing base; the region in front

of wing base is yellow; on the disk there are numerous hairs and two pairs of macrochætæ; pleuræ opaque black-brown, the sutures paler; scutellum opaque black-brown, a spot at each side at base, one before middle on disk and two at apex pollinose; four marginal bristles present. Abdomen yellowish-brown, each segment narrowly paler anteriorly and posteriorly, a spot of white pollinose color on each segment laterally; numerous scattered hairs on segments, especially on sides and at apex. Legs brown, apices of femora, base, middle, and apices of tibiæ narrowly, apices of first and second, and whole of third joints of tarsi white; all legs with rather distinct hairs, those on posterior surfaces of fore tibiæ and tarsi very long and conspicuous; mid tibiæ with three pairs of dorsal bristles and one ventral bristle which is situated at near to middle; basal joint of hind tarsi very much dilated, about two-thirds as long as second joint which is less thickened. Wings fuscous with hyaline patches (see fig. 1); disk microscopically hairy, costa soft but long haired, bend of second vein appendiculate. Halteres yellow.

Length.—2 mm.

Type.—Cat. No. 15308, U.S.N.M.

Locality.—Manila, Philippine Islands (collector, R. Brown).

This species has a resemblance to *venalicia* Osten Sacken but the very different venation serves to separate them at once.

PIPUNCULUS VIERECKI, new species.

Plate 46, figs. 4 and 5.

Female.—Head exceptionally large, eyes very narrowly separated, frontal stripe slightly widened on center, entirely covered with silvery pile, only the ocellar region black, frons not widened at above antennæ, and not raised in center, eye facets on whole front of eyes from upper portion of frons to middle of face very strikingly enlarged; face silvered, becoming broader toward mouth, at upper margin as broad as frons at above antennæ; antennæ yellow, basal joint brown, second joint with very short hairs above and two to three short but strong bristles on under surface, third joint elongate and acuminate (see fig. 5); arista pale and swollen at base, black from just beyond base, palpi and proboscis yellow. Mesonotum subshining, closely and finely punctate, black with three longitudinal stripes showing through the slight whitish pollinosity of the disk; the stripes are abbreviated posteriorly, no distinct discal hairs present, only a few on humeri and lateral margins; humeri black, a slight depression on posterior third of disk beyond termination of stripes; suture between scutum and scutellum deep owing to the swelling of those parts at their extremities; pleuræ black, whitish dusted, scutellum almost bare, concolorous with scutum. Abdomen short, ovate, almost bare, black, first segment very short, whitish pollinose, all other segments

with lateral white pollinose spots low down, basal fringe sparse, black, ovipositor long and acute (see fig. 4), brown at base, yellow on acuminate portion, hairs on base yellow. Legs yellow, fore coxæ black, hind pairs brownish, last tarsal joint on all legs brown, fore and mid femora on posterior surfaces and hind femora on anterior surfaces white pollinose, all tibiæ white pollinose on dorsal surfaces; all femora with double row of short black thorns on apical half of ventral surface, hind pair thickened and with sparse pale pubescence posteriorly; all tibiæ with double row of dorsal and rather irregular anterior and posterior rows of very short black thorns; hind tibiæ thickened and bent, apical joints of all tarsi with several long black hairs, basal joint of hind tarsus thickened, pulvilli very large, yellow. Wings clear, stigma fuscous, not reaching to end of auxiliary vein, second and third costal divisions subequal, inner cross vein below end of auxiliary vein and at slightly before end of basal third of discal cell, outer cross vein at its own length from end of fifth vein. Halteres yellow.

Length.— $3\frac{1}{2}$ mm.

Type.—Cat. No. 15272, U.S.N.M.

One female, Plummers Island, Maryland, October 5, 1912 (J. R. Malloch).

Allied to *atlanticus* Hough and *houghii* Kertesz, from which the elongate antennæ easily separates it. The very pale antennæ and legs and the large head are characters which distinguish this from any described American species.

Named in honor of Mr. H. L. Viereck, who collected a large amount of material in this genus in New Mexico, which is recorded in Cresson's paper on the family,¹ and at whose invitation I visited the type-locality on the date of capture.

PIPUNCULUS WINNEMANNÆ, new species.

Plate 46, figs. 2 and 3.

Male.—Eyes coherent for longer than the length of frons, frons black, white dusted except on the raised central ridge of upper half; face brown, as broad as frons at above antennæ, parallel-sided, covered with grayish dusting; antennæ black, third joint acuminate (see fig. 3), arista glossy brown and swollen at base, palpi small, brown; occiput white dusted on lower half, brown dusted above, postocular cilia white. Mesonotum subopaque brown-black, a very few microscopic hairs on disk and numerous short ones on lateral margins; humeri black-brown; pleuræ slightly shining, black with whitish dusting; scutellum subopaque, a few pale post-marginal hairs present, postnotum gray-brown dusted. Abdomen short and rather broad, slightly oval in outline, segments opaque brown at bases, sub-

¹ Trans. Amer. Ent. Soc., vol. 36, 1911, pp. 267-329.

shining at apices and with distinct whitish lateral post-marginal dusting; basal fringe very short, black; scattered black hairs on lateral margins of segments, those on apical segment more distinct and extending to disk; hypopygium large, distinctly cleft on left side, apical depression absent; the ventral processes large. (See fig. 2.) Legs black, only the extreme apices of femora and bases of tibiæ yellowish; fore and mid femora whitish dusted posteriorly, hind femora glossy posteriorly; ventral thorns present on apical half of mid femora only, no long pubescence either on femora or tibiæ, all femora slender; hind tibiæ with rather distinct setulose hairs on apical half of antero-dorsal surface, and apical half of postero-ventral surface as well as same surface of basal hind tarsal joint with short, stiff, golden hairs; claws as long as apical joint of tarsi, which have three long apical hairs. Wings grayish, stigma slightly short of end of auxiliary vein, second costal division twice as long as third; inner cross vein at just beyond end of auxiliary vein and at slightly short of basal third of discal cell, outer cross vein straight, at its own length from apex of fifth vein, outer portion of fourth vein straight. Halteres brown, pale at base of knob.

Length.—2 mm.

Type.—Cat. No. 15309, U.S.N.M.

One male, Plummers Island, Maryland, October 12, 1912 (H. L. Viereck).

Allied to *stigmatica* Malloch and also to *alternatus* Cresson. The unthickened costa readily separates it from the former and the smaller size and differently shaped antennæ from the latter.

STEINOMYIA, new genus.

Eyes in male separated at vertex by one-fifth the width of head, besides the strong cruciate frontal rows of bristles situated on the inner edge of the orbits there are two pairs of strong bristles situated on the orbits, the upper, backwardly directed pair slightly in front of the anterior ocellus and the lower, outward and slightly backwardly directed pair the breadth of frons lower down from these, in addition to these bristles there is a continuous row of short setulæ from upper angle of orbits to lower angle of frontal stripe; lower margin of frons, at above antennæ, twice as wide as at vertex. Sides of face divergent, one-third wider at epistome than at base of antennæ, orbits higher than facial ridge, vibrissæ strong, incurved, the upper strongest, not continued to apex of third antennal joint, in profile the head is as in *Fannia*. Antennæ shorter than face, arista very indistinctly pubescent. Mesonotum with 2 pairs of presuturals and 3 pairs of postsuturals; acrosticals in three rows; 2 sternopleurals, 5-6 mesopleurals, and 2 moderately strong discal scutellar as well as the normal marginal bristles and discal hairs. Abdomen ovate, flattened,

one and one-half times as long as greatest breadth, hypopygium very inconspicuous. Legs somewhat similar in form and chaetotaxy to some species of *Fannia* but in one specimen there is a distinct bristle on the ventral surface of the mid tibia, which I consider abnormal. Wing venation as in *Fannia*.

Type of genus—*Steinomyia steini*, new species.

STEINOMYIA STEINI, new species.

Male.—Black, shining; frontal orbits silvered, frontal stripe velvety black, face brown, gray dusted; besides the vibrissæ there are 3-4 smaller bristles external to the anterior pair; palpi black, of moderate length, with hair-like bristles; proboscis as in *Fannia*, antennæ black, third joint $2\frac{1}{2}$ times as long as second, gray pruinose. Mesonotum unstriped, the sides white dusted; pleuræ white dusted, scutellum concolorous with mesonotum. Abdomen with very slight whitish surface dusting, no trace of any dorso-central stripe; second segment slightly longer than third, third and fourth subequal, fifth longer than second, first very short, all segments with numerous short discal hairs, second with long lateral, third and fourth with long lateral post-marginal, and fifth with several long lateral and two apical bristles; on ventral surface the last segment is distinctly bristled; hypopygium black, gray pruinose, symmetrical, the two rounded lateral plates inclosing the genital organs each with one long and several shorter apical bristles, ventrally the organs are yellowish brown. Legs black; fore femora with three rows of bristles, one on each of the three posterior surfaces, fore tibiæ with one bristle at near to apex on dorsal surface, mid femora not distinctly constricted on apical third, antero-ventral surface with a series of 7 evenly spaced bristles on basal three-fifths the last two of which are distinctly stronger than first five, beyond these is a series of about 12 comblike short bristles which decrease slightly toward tip, antero-dorsal row of 16 bristles decreasing slightly in size beyond middle and the last 3-4 at apex suddenly enlarged, postero-ventral row with 1 very long hairlike basal bristle, 9 hairlike bristles on basal two-thirds, and 2 strong and several successively weaker bristles on apical third, posterior row long and hairlike except apical 3-4 which are strong; mid tibiæ slightly thickened on apical two-fifths, the pubescence barely longer on ventral surface than on dorsal, one antero- and one postero-dorsal bristle at apical third and one dorsal bristle at apex; hind femora bare on antero-ventral surface, two long bristles on apical third of postero-ventral surface and the normal curved posterior row present, the last 3 being strongest; hind tibiæ slightly bent, antero-dorsal surface with a continuous row of short bristles (17-18) the last (apical) 3-4 strongest and most widely spaced, the usual 2 dorsal bristles as in *Fannia*, antero-ventral surface with 1-2

bristles at beyond middle, postero-ventral surface bare. Wings clear, third and fourth veins slightly convergent at apices, outer cross vein bent, at less than its own length from end of fifth and at one-fourth from small cross vein to apex of fourth; costal thorn absent. Calyptræ white, the under scale much the larger. Halteres yellow, base of stalk darkened.

Length.—4-4½ mm.

Type—Cat. No. 15310, U.S.N.M.

Three males, Bonhill, Dumbartonshire, Scotland, June 29, 1907, and August 8 and 29, 1908 (J. R. Malloch).

This genus is closely allied to *Fannia* Robineau-Desvoidy, but may be easily separated by the wider frons, different frontal bristling, and unmarked abdomen, as well as several minor characters given in description. The species bears a remarkable resemblance to the females of certain species of *Fannia*.

Named in honor of Herr P. Stein, whose work on this group in Europe has laid the foundation of practically all that has been done in systematic work on it in recent years.

EXPLANATION OF PLATE 46.

- Fig. 1. Wing of *Limosina picturatus*, male.
2. Hypopygium of *Pipunculus winnemannæ*, male.
3. Antenna of *Pipunculus winnemannæ*, male.
4. Ovipositor of *Pipunculus vierecki*, female.
5. Antenna of *Pipunculus vierecki*, female.
6. Face of *Simulium bicoloratum*, female.
7. Thorax of *Simulium bicoloratum*, female.
8. Claw of *Simulium bipunctatum*, female.
9. Claw of *Simulium townsendi*, female.